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APPLICATION FOR LETTERS PATENT

**Electronic Program Guide With Hyperlinks To Target
Resources**

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TECHNICAL FIELD

This invention relates to interactive entertainment systems, such as interactive television or interactive computing network systems, and to electronic program guides which operate in conjunction with these systems. More particularly, this invention relates to methods for using electronic programming guides to access supplemental hyperlink content which enables viewer interactivity with continuous video programs.

BACKGROUND OF THE INVENTION

Television viewers are very familiar with printed programming schedules that appear in daily newspapers or weekly magazines, such as TV Guide®. The printed program guide lists the various television shows in relation to their scheduled viewing time on a day-to-day basis.

Cable TV systems often include a channel with a video broadcast of the printed program guide. The cable channel is dedicated to displaying listings of programs available on the different available channels. The listings are commonly arranged in a grid. Each column of the grid represents a particular time slot, such as 4:00 p.m. to 4:30 p.m. Each row represents a particular broadcast or cable channel, such as ABC, PBS, or ESPN. The various scheduled programs or shows are arranged within the rows and columns, indicating the channels and times at which they can be found. The grid is continuously scrolled vertically so that a viewer can scan a continuously refreshing set of programs within three or four time slots.

Data regarding the available programs is typically received by a cable system as a plurality of data records. Each available program has a single

1 corresponding data record indicating a variety of information about the program
2 such as its channel, its starting and ending times, its title, names of starring actors,
3 whether closed-captioning and stereo are available, and perhaps a brief description
4 of the program. It is not difficult to format a grid such as described above from
5 this type of data records. The grid is typically formatted once at the cable system's
6 headend and broadcast repeatedly and continuously to the thousands of homes
7 served by the cable system.

8 Newer, interactive cable distribution systems feature electronic program
9 guides (EPGs) which function somewhat similar to the broadcast program listing
10 channels described above. Rather than scrolling automatically, however, an EPG
11 allows a viewer to use a remote control device to scroll as desired both
12 horizontally and vertically through a program grid. This functionality utilizes the
13 two-way communications capabilities of interactive cable systems.

14 The EPG is typically implemented in software which runs on a set-top box
15 (STB) connected between a TV and a cable system home entry line. When
16 scrolling to a new column or row, the set-top box inserts the appropriate
17 programming information into each new row or column. This information is either
18 cached at the STB, or requested from the cable system's headend.

19 Interactive systems permit viewers to control what programs are shown on
20 their TV and when. Movies-on-demand is one example of this interactive control.
21 A viewer can peruse a list of available movies from a menu or the EPG, and then
22 order a selected movie. The STB sends a request for the movie to the headend
23 server. The movie is retrieved and transmitted to the requesting STB. Movies-on-
24 demand thus enables viewers to shop, purchase, and watch a movie at their
25

1 convenience, as opposed to being restricted to certain start times as is typical with
2 conventional premium or pay-per-view channels.

3 Many industry and commercial experts expect interactive TV systems to
4 evolve to the point of offering many other interactive services to the consumers.
5 For instance, consumers will be able to use their TV to shop for groceries or other
6 goods, conduct banking and other financial transactions, play games, or attend
7 educational courses and take exams.

8 There is a rapidly expanding interest in online services provided over public
9 networks to home or business computers. Most notably, the Internet is emerging as
10 a means for supplying video, sound, pictures, text, and other multimedia rich
11 resources to a user's computer. Using the Internet, users can access a wide variety
12 of resources that are maintained on many computers located around the world.

13 Resources available on the Internet are most commonly presented as
14 hypertext. "Hypertext," also referred to as "hypermedia," is a metaphor for
15 presenting information in which text, images, sounds, and actions become linked
16 together in a complex, non-sequential web of associations that permit a user to
17 browse through related topics, regardless of the presented order of the topics.
18 Hypermedia content is widely used for navigation and information dissemination
19 on the "World-Wide Web" (WWW or Web) of the Internet. An application
20 program referred to as a "Web browser" is normally used to retrieve and render
21 hypermedia content from the WWW.

22 Hypermedia content is commonly organized as documents with embedded
23 control information. The embedded control information includes formatting
24 specifications, indicating how a document is to be rendered by the Web browser.
25 In addition, such control information can include links or "hyperlinks," which are

1 symbols or instructions telling the Web browser where to find other related WWW
2 documents on the Internet. A hyperlink from one hypermedia topic to another is
3 normally established by the author of a hypermedia document, although some
4 applications allow users to insert hyperlinks to desired topics.

5 A hyperlink is typically rendered by a Web browser as a graphical icon or as
6 highlighted keywords. A user “activates” or “follows” a hyperlink by clicking on
7 or otherwise selecting the icon or highlighted keywords. Activating a link causes
8 the Web browser to retrieve and render the document or resource that is targeted by
9 the hyperlink.

10 Associated with a hyperlink’s icon or highlighted keywords is an underlying
11 target specification. The target specification is set forth in the underlying
12 hypermedia document, but is normally invisible to the user. The target
13 specification unambiguously identifies a targeted document or resource, typically
14 specifying the name of the computer on which the document resides and the
15 complete file name of the document. In WWW documents, targets are specified
16 using “universal resource locators” (URLs). A URL describes everything about a
17 particular resource that a Web browser needs to know to request and render it. The
18 URL describes the protocol a browser should use to retrieve the resource, the name
19 of the computer it is on, and the path and file name of the resource.

20 The following is an example of a URL:

21
22 `HTTP://www.microsoft.com/upgrades`
23

24 The “http://” portion of the URL describes the protocol. The letters “http”
25 stand for HyperText Transfer Protocol, the set of rules that a browser will follow to

1 request a document and the remote server will follow to supply the document. The
2 “www.microsoft.com” portion of the URL is the name of the remote host computer
3 which maintains the document. The last portion “/upgrades” is the path and file
4 name of the document on the remote host computer.

5 Hypermedia content utilized by the WWW is commonly written using what
6 is referred to as a “markup language.” “SGML” (Standard Generalized Markup
7 Language) is one such language, defined formally as “a language for document
8 representation that formalizes markup and frees it of system and processing
9 dependencies.” SGML is a language for describing the structure of documents and
10 for describing a tagging scheme to delineate that structure within text.

11 For creating hypermedia content, WWW documents utilize a subset of
12 SGML called “HTML” (Hypertext Markup Language). An HTML textual
13 document can be thought of as plain text that contains formatting instructions in
14 the form of HTML markup codes or “tags.” Tags tell Web browsers how to render
15 and print documents, and are also used to specify hyperlinks.

16 The following is a simple example of a portion of an HTML document
17 containing a single hyperlink:

18
19 Microsoft has a Web page with the latest
20
21 upgrades to its popular word processing
22 program.

22 When rendered by a web browser, the word “upgrades” would appear
23 highlighted and/or underlined to the user, and the text within the angled brackets
24 would not appear at all, as follows:
25

1 Microsoft has a Web page with the latest upgrades
2 to its popular word processing program.
3
4

5 By clicking on the highlighted keyword "upgrades," the user can instruct
6 the Web browser to activate the underlying URL. In this case, the underlying URL
7 is to an HTTP (hypertext) document located at host computer
8 "www.microsoft.com," having the file name "upgrades."

9 The angled brackets in the example define hypertext tags. In most cases,
10 tags occur in pairs: a start tag and an end tag. The start tag indicates where a
11 particular formatting is to begin, and a corresponding end tag indicates where the
12 formatting is to end. A start tag begins with a code (after the leading angled
13 bracket) indicating a tag type. An end tag consists of that same code, preceded by
14 a forward slash.

15 In the example above, the leading "A" in the start tag indicates that it is an
16 "anchor" tag—the type of tag that defines a hyperlink. The start tag contains a tag
17 "attribute," indicating a target specification:

18 HREF="HTTP://www.microsoft.com/upgrades".
19

20 In concept, the target of a hyperlink can be virtually any type of object—
21 including executable programs, text or multimedia documents, sound clips, audio
22 segments, still images, computers, directories, and other hyperlinks. In WWW
23 documents, hyperlink targets are most often files that can reside on any computers
24 connected to the Internet. However, a hyperlink target can also be a particular
25

1 location within a document, including the document that is currently being
2 rendered.

3 Hypertext usage is not limited to the Internet. Various multimedia
4 applications utilize hypertext to allow users to navigate through different pieces of
5 information content. For instance, an encyclopedia program might use hyperlinks
6 to provide cross-references to related articles within an electronic encyclopedia.
7 The same program might also use hyperlinks to specify remote information
8 resources such as WWW documents located on different computers.

9 Today, there is a convergence in some respects of the content available on
10 traditional cable and broadcast TV and the content provided over the Internet.
11 There is an increasing number of TV- and movie-related Web sites. For instance,
12 computer users can access a CNN Web site for recent news in addition to, or in
13 lieu of, tuning their televisions to the CNN channel. Computer users can browse
14 through an ESPN Web site for sports information, or through a Web site from
15 Universal Studios for facts on latest movie releases. Recently, Microsoft
16 Corporation and NBC Studios formed a joint venture to produce a 24-hour news
17 program with supporting Web site.

18 Despite the convergence of subject matter, the Internet and TV have
19 remained somewhat separate, particularly in viewer's minds. A viewer watches the
20 programs on his/her TV and then, to access the Internet, switches to a computer to
21 browse Web sites for any related content.

22 The inventors have developed a better way of integrating supplemental
23 content, be it on the Internet or elsewhere, with conventional TV and movie
24 programs.
25

SUMMARY OF THE INVENTION

This invention concerns integrating hyperlinks into an electronic programming guide (EPG) used in an interactive entertainment system. The system includes a program provider which distributes video content programs to multiple subscribers over a distribution network (e.g., cable, telephone, broadcast, etc.). Each subscriber has a user interface unit in the form of a set-top box or computing unit which receives the digital video program and converts it for display on a television or other display unit.

The user interface unit has a processor and memory. The EPG resides in the memory and is executable on the processor to organize programming information that is descriptive of programs supplied over the interactive entertainment system. The EPG supports a user interface (UI) which visually correlates programs titles to scheduled viewing times. One UI arrangement consists of a grid having program tiles arranged horizontally beside corresponding channel tiles and vertically beneath a continuous time line that is delineated by periodic time increments, such as half-hour intervals.

A hyperlink browser also resides in memory and is executable on the processor. One or more hyperlinks, which reference target resources containing interactive supplemental content related to the programs, are displayed within the EPG UI. The hyperlinks can be placed in the program tiles, channel tiles, or description area, and can be situated alone or embedded within other text. When a viewer activates a hyperlink from the EPG UI, the user interface unit launches the browser to activate the target resource specified by the hyperlink. The data retrieved from the target resource is then displayed on the display unit.

1 By integrating the hyperlinks within the EPG UI, the viewer can readily
2 identify supplemental information to the programs and access that information
3 directly from the EPG. The viewer no longer needs to remember that there may be
4 a Web site associated with a particular program or channel, nor is the viewer
5 relegated to surfing the Internet from a separate machine to find any related
6 content.

7 According to another aspect of this invention, the user interface unit
8 employs an operating system which supports drag-and-drop functionality. While
9 reviewing available programs in the EPG, the viewer can drag a particular program
10 or channel label from its location within the EPG UI and drop the label at another
11 location on the display unit. The operating system associates an instruction with
12 the label that will execute in response to activation of the label to tune the visual
13 display unit to the program or channel represented by the particular label. In this
14 manner, the viewer can simply activate the label to return to a particular channel or
15 program, even if the EPG is not active. If the program is not yet playing, the
16 shortcut might further include instructions to activate any related target resource,
17 such as an associated Web page, or to initiate procedures to record the program
18 when it begins playing.

19 20 **BRIEF DESCRIPTION OF THE DRAWINGS**

21 Fig. 1 is a diagrammatic illustration of an interactive entertainment system
22 according to one implementation. The Fig. 1 implementation is representative of
23 an interactive TV system.

24 Fig. 2 is a simplified example of data fields in a data structure maintained
25 by an electronic programming guide.

1 Fig. 3 is a diagrammatic illustration of an interactive entertainment system
2 according to a second implementation, which is representative of an interactive
3 integrated PC-TV system.

4 Fig. 4 is a block diagram of a user interface unit according to an aspect of
5 this invention.

6 Fig. 5 is an exemplary screen illustration of an EPG user interface (UI)
7 having hyperlinks.

8 Fig. 6 is a flow chart of a method for creating an EPG data structure.

9 Fig. 7 is identical to Fig. 5, but further illustrates a drag-and-drop operation
10 according to an aspect of this invention.

11 Fig. 8 is a flow chart of a method for operating an EPG.

12 13 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

14 Fig. 1 shows an interactive entertainment system 20 implemented as an
15 interactive television (ITV) system. System 20 includes a centralized headend 22
16 which is configured to provide continuous video content programs to multiple
17 subscribers. Programs provided by headend 22 might include traditional broadcast
18 TV shows, on-demand movies and games, and other services such as those
19 commonly provided in the past by on-line computer services. A single headend
20 might service 250,000 or more subscribers.

21 Each subscriber has a user interface unit 24. In the illustrated
22 implementation, the user interface unit is embodied as a set-top box (STB) 26
23 coupled to a television (TV) 28. The STB 26 receives digital video signals from
24 headend 22 and controls which programs are displayed on the TV 28. The STB 26
25 is controlled by the viewer through use of a panel control located on its face, or a

1 hand held remote control unit 30. Instead of a separate STB, however, a user
2 interface unit can be incorporated in the TV itself. In addition to televisions, the
3 user interface unit might be implemented with other types of visual display units,
4 such as a computer monitor. Furthermore, as is described below with respect to
5 the Fig. 3 implementation, the user interface unit might be implemented as a
6 computer having tuner equipment installed therein to receive the video data.

7 Each user interface unit 24 is configured to run an electronic program guide
8 (EPG). The EPG provides an on-screen listing of various programs or program
9 titles. The listing is organized in a predetermined arrangement that is displayed on
10 the television. The EPG might also include other descriptive information,
11 including whether the program is provided in closed caption, stereo, or alternate
12 audio tracks, or is rated.

13 Headend 22 is interconnected to the subscribers via a distribution structure
14 or network 32. The distribution structure 32 can be implemented in different ways.
15 One implementation is a multi-tier network which includes a high-speed, high-
16 bandwidth fiber optic cable network between the headend and regional distribution
17 nodes (not shown), and conventional home entry lines, such as twisted-pair lines or
18 coaxial cable, between the distribution nodes and user interface units. As an
19 example, each distribution node might support approximately 1000-2000 user
20 interface units. Other implementations include satellite communications (e.g.,
21 DSS technologies), RF communication, or other wireless technologies. Moreover,
22 there network can be constructed using a combination of wireless and wire-based
23 technologies.

24 In the illustrated implementation, the network 32 provides both the pipeline
25 for distribution of programs from the headend to the subscriber, as well as a back

1 channel which enables communication from the subscriber to the headend. The
2 back channel permits the viewer to send requests and instructions to the headend to
3 facilitate interactive control. The back channel might also be implemented using a
4 different network, as is described in the Fig. 3 implementation, and the separate
5 network might be based on a wired technology, a wireless technology, or a
6 combination of the two.

7 Headend 22 provides video content programs to the user interface unit 24.
8 The programs are embodied as video data streams that are transmitted from
9 headend 22 over distribution structure 32 to the user interface unit. The headend
10 maintains a database of programs 40, such as feature-length movies, past TV
11 shows, or games, that can be requested by viewers and played to them individually
12 in an on-demand mode. The headend can also retransmit to its subscribers
13 broadcast video signals that it receives from another source, such as a satellite feed
14 or another cable system. The video data streams are sent to the user interface units
15 in digital or analog format.

16 Headend 22 includes a continuous media server 42 which distributes the
17 digital video data streams kept on the programs database 40. The continuous
18 media server and video program database are preferably implemented as a disk
19 array data storage system consisting of many large capacity storage disks. The
20 video data streams of the movies are stored digitally on the storage disks in
21 predetermined or mapped locations. The locations of the video data streams are
22 kept in a memory map and each video data stream can be accessed through
23 pointers to the particular memory location. The continuous media server can
24 service simultaneous requests to view a movie on demand (even the same movie)
25 from many viewers.

1 An EPG server 44 is also provided at headend 22 to serve the programming
2 information needed by the EPG at the user interface unit 24. The EPG server 44 is
3 implemented as a structured query language (SQL) database 46 with records
4 containing information relating to available shows or programs.

5 Fig. 2 shows an example data structure 48 for organizing programming
6 information within the EPG database 46. The data structure includes various data
7 fields 50 for holding programming information. The data fields contain program
8 titles, actor names, whether the program has closed captioning or stereo audio, the
9 scheduled time of the program, the network name, and description text. The data
10 structure 48 also holds pointers to locations within the storage subsystem of the
11 continuous media server 42 which identify storage locations of the video data
12 streams of the programs corresponding to the program records.

13 With reference again to Fig. 1, the headend 22 further includes an enhanced
14 content server 52 which serves supplemental interactive content to the user
15 interface units to enhance or supplement the video content programs served by the
16 continuous media server 42. The supplemental content is stored digitally in
17 database 54 and can be text, hypermedia, graphics, video, picture, sound, or other
18 multimedia types. Examples of possible supplemental content include interactive
19 questions or games related to the program, additional trivia on the movies or TV
20 shows, advertisements, available merchandise or other memorabilia, Web pages to
21 programs of similar type or starring the same actors/actresses, and so on.

22 As shown in Fig. 2, the data structure 48 includes a data field 58 with a
23 target specification in the form of a pointer "CONTENT1" to the supplemental
24 content stored at the headend. Through the data structure, the target specifications
25 to supplemental interactive content are correlated with the programs to which they

1 supplement. The presence of a target specification within the data field 58
2 indicates that the associated program is interactive and complementary content can
3 be displayed in addition to the program itself.

4 It is noted that portions of the program database 40, EPG database 46, and
5 supplemental content database 54 might additionally be cached locally at the user
6 interface unit, or served regionally by regional servers, as opposed to keeping
7 every piece of data at the headend. The headend downloads the relevant
8 programming to each regional server, or directly to the user interface units in a
9 periodic or selective manner. In this manner, the interactive functionality is
10 handled regionally or even locally. Various optimizing techniques, such as local
11 caching, can be employed to reduce load on the network or improve performance
12 of the user interface units.

13 Fig. 3 shows an interactive entertainment system 60 according to a second
14 implementation which accommodates third party independent service providers.
15 Interactive entertainment system 60 includes headend 22 which supplies programs
16 and supplemental content to a user interface unit 62. In this implementation, the
17 user interface unit 62 is implemented as a computer 64 with a monitor 66, a central
18 processing unit 68, a keyboard 70, and a mouse 72 (although other input devices
19 can be used in addition to, or instead of, the keyboard and mouse, such as a hand
20 held remote control unit with a pointing device).

21 The headend 22 serves the programs over a first network 74, which may be
22 implemented like the fiber optic distribution structure described above, or as a
23 satellite system or other wireless broadcast system, or as a conventional data
24 network. The video data can be transmitted using both analog and digital
25 transmission formats. In the context of this invention, the terms "visual display

1 unit", "display unit", or "display" are not limited to any form or type of receiver,
2 nor to any type of distribution network or transmission format.

3 The interactive entertainment system 60 also includes an independent
4 service provider (ISP) 80 which distributes digital content to the user interface unit
5 62 over a second network 82. An example of the second network 82 is a public
6 network, such as the Internet. The ISP 80 has an ISP host 84 and a content
7 database 86 to serve various multimedia content to the user. For instance, the ISP
8 host 84 might store one or more target resources (such as a Web page) that can be
9 rendered by the user interface unit 62.

10 According to this Fig. 3 arrangement, the user interface unit 62 receives
11 traditional and on-demand programs from the headend 22, and supplemental
12 interactive content from either the headend 22 or from an independent service
13 provider 80. The back channel for facilitating interactive control is provided
14 through either network 72 or 82. The off-site supplemental information provided
15 by the ISP is correlated with the programs within the program records data
16 structure 48 in EPG server 44. As shown in Fig. 2, the data field 58 includes target
17 specifications to supplemental content provided by other servers. IN the illustrated
18 example, the programs Seinfeld and Star Trek have associated supplemental
19 content provided by ISP which are located by the hyperlink URLs in corresponding
20 data field 58.

21 Fig. 4 shows a user interface unit, referenced generally as numeral 90, in
22 more detail. The user interface unit 90 includes a processor 92, a volatile memory
23 94, and a program memory 96. The user interface unit 90 also has at least one
24 receiver, and possibly two receivers, for receiving the video streams from the
25 headend and the digital supplemental data from the headend or ISP. The first

1 receiver is in the form of a tuner 98 which tunes to the channel or broadcast
2 frequency to receive a video data stream from a program source, such as the
3 headend or other program provider. The second receiver, referenced generally as
4 100, can be a second tuner for receiving the content over a cable or wireless
5 distribution network, or a modem for receiving the supplemental content over the
6 Internet or other data network.

7 The viewer computer runs an operating system 101 which supports multiple
8 applications. The operating system 101 is stored in memory and executes on the
9 processor. The operating system is preferably a multitasking operating system
10 which allows simultaneous execution of multiple applications. The operating
11 system 101 employs a graphical user interface windowing environment which
12 presents the applications or documents in specially delineated areas of the display
13 screen called "windows." One preferred operating system is a Windows® brand
14 operating system sold by Microsoft Corporation, such as Windows® 95 or
15 Windows® NT or other derivative versions of Windows®. However, other
16 operating systems which provide windowing environments may be employed, such
17 as the Macintosh operating system from Apple Computer, Inc. and the OS/2
18 operating system from IBM.

19 A channel navigator application 102 is stored in program memory 96 and
20 executes on the processor 92 to control the tuner(s) 98 and 100 to select a desired
21 channel for receiving the video content programs. An EPG application 104 is
22 stored in program memory 96 and executes on the processor 92 to organize
23 programming information downloaded from the EPG server at the headend. The
24 EPG 104 supports a displayable user interface (UI) which visually correlates
25 programs titles to scheduled viewing times and tuning information, such as a

1 channel, as will be described below with reference to Fig. 5. The user interface
2 unit 90 also has a browser 106 which is kept in memory 96 and dynamically loaded
3 on processor 92 when needed to render content, such as a hypertext document,
4 from an ISP or other content provider. The browser can be implemented as a
5 hyperlink browser, or more particularly, as an Internet Web browser.

6 Fig. 5 shows an example EPG UI 110 which is presented on a display 112.
7 The EPG UI 110 includes a channel panel 114, a time panel 116, a program grid
8 118, and a program summary panel 120. Channel panel 114 provides a vertical
9 scrolling list which displays four channel tiles 122 at any one time. Each channel
10 tile 122 includes a channel number and a channel name (typically the network
11 name, such as CBS and ABC), and might also include a channel logo. The channel
12 panel 114 defines four rows of program titles in program grid 118. Time panel 116
13 is a horizontal scrolling continuous time line with markings denoting half-hour
14 time segments. Time panel 116 defines columns in program grid 118.

15 Program grid 118 consists of multiple program tiles 124 organized in
16 channel-based y-axis and time-based x-axis. The grid is located to the right of
17 channel panel 114 and below time panel 116. Each program tile 124 has the
18 program title and any secondary program descriptive information, such as closed
19 caption, stereo, etc. The illustrated screen shows an example programming line-up
20 for 8:00 p.m. to 10:00 p.m. PST, Thursday, March 7, 1996. The program titles,
21 such as "Murder, She Wrote" and "Friends," are arranged horizontally with respect
22 to their networks CBS and NBC and vertically with respect to their start times of
23 8:00 p.m. PST.

24 The viewer controls the program selection with a single focus frame 126
25 which is graphically overlaid on the program grid 118. Focus frame 126 can be

1 moved up or down, or left and right within a channel line-up, to choose a desired
2 program. A remote control handset, a touch control panel, keyboard, mouse, or
3 other manipulating mechanism can be used to position the focus frame 126 within
4 the EPG UI.

5 Program summary panel 120 includes a text description window 128 and a
6 preview window 130. The text description window 128 displays program
7 information related to the program that is highlighted by the focus frame 126 in
8 program grid 118. Here, the NBC program "Seinfeld" is highlighted and the text
9 description window 128 lists the program title "Seinfeld," and a program
10 description of the current episode. The text description window 128 might also
11 include other program related information like closed-captioning, stereo, etc. The
12 preview window 130 is used to display clips of the selected highlighted show.

13 The data to fill the various tiles and windows is supplied by the headend 22
14 from the EPG server 44. The data maintained in data structure 48 (Fig. 2) is
15 transmitted as program records to the user interface unit and cached in local
16 memory. Data records for upcoming programs can be downloaded on a periodic
17 basis, or alternatively, individual data records for certain programs and channels
18 can be selectively transmitted in response to viewer requests. The EPG 104 inserts
19 the appropriate data records into the EPG UI for display as the viewer maneuvers
20 the focus frame 126 around the grid.

21 The EPG UI 110 also includes hyperlinks 140 integrated as part of the grid.
22 The hyperlinks are supplied with the program records received from the headend
23 22. These hyperlinks can be inserted into the channel tiles 122, program tiles 124,
24 or the description window 128. In the Fig. 5 illustration, the hyperlink "More" is
25 provided in the description window 128 to reference target resources that contain

1 additional information about this episode of the Seinfeld show. Other hyperlinks
2 in the description window 128 include "Last Week" which references a target
3 resource containing information on the previous week episode, and "comedy club"
4 which links to a target resource having video coverage of comedian Jerry Seinfeld
5 performing at night clubs. The target resources referenced by the hyperlinks might
6 be located at the headend (Fig. 1 implementation), or at an independent service
7 provider (Fig. 3 implementation). The target resource might further be located
8 locally, having been pre-cached by the system. For instance, the system might pre-
9 cache supplemental information about certain shows before they air based on
10 predictive viewing tendencies, or as part of a promotional data broadcast
11 advertising the show. This permits local interactive functionality between the
12 viewer and the viewer computing unit, in addition to full network interactive
13 functionality between the viewer and the program provider.

14 A hyperlink "NBC" appears in the program tile 122 to provide access to an
15 NBC web site. Hyperlinks are also show embedded in the program tiles 124, as
16 represented by links "Hitler," "Pearl Harbor," and "A-Bomb" to additional material
17 on World War II to supplement the documentary being shown on PBS.

18 The viewer activates a selected hyperlink by clicking on it (via a cursor or
19 other indicator which may be the same as or separate from the focus frame 126). If
20 the hyperlink references materials from the headend, the user interface unit sends a
21 request containing the target specification over the network to the enhanced
22 content server 52. The enhanced content is located at the enhanced content server
23 52 and transmitted from the headend back over the network to the requesting user
24 interface unit.
25

1 If the hyperlink references a target resource from an ISP, such as a
2 hypermedia document in the form of a Web page or the like, the user interface unit
3 launches the browser 106 to render the hypermedia target resource. The hypertext
4 document is retrieved over a separate network, such as the Internet, and supplied to
5 the user interface unit.

6 The EPG 104 supports other on-screen display formats besides the format
7 shown in Fig. 5. For instance, the EPG might group program titles according to
8 their content, such as sports or dramas. Alternatively, the EPG might group titles
9 according to the viewer's preference. In addition, the EPG UI might also include
10 independent or small groupings of program or channel labels that are presented on
11 the screen at various times. At one instance, the EPG UI might include a set of
12 labels in a toolbar-like appearance. At another instance, the EPG UI might consist
13 of a single small logo representing a program which is exposed in the corner of the
14 screen during display of that program. Activation of the logo jumps the user to a
15 Web site or other target resource in the middle of the Seinfeld program.

16 The EPG can also be configured to use techniques other than, or in addition
17 to, scrolling to locate the desired program title. One example technique is to
18 provide for key word searching that allows the viewer to identify a particular show.
19 Once identified, the EPG would immediately display the relevant program grid
20 pertaining to that show.

21 The EPG can also perform a search to locate interactive programs. Fig. 6
22 shows a method for constructing an EPG data structure and subsequently operating
23 the EPG to search and locate interactive programs. Steps 150-154 concern the
24 development of the EPG data structure 48 shown in Fig. 2. Separate data fields 50
25 for holding programming information are designated in the EPG structure (step

150). One of the data fields 58 is dedicated to storing target specifications to supplemental content. The target specifications can be in the form of memory pointers, hyperlinks, URLs, or any other designation for referencing a location containing supplemental content.

For programs with no supplemental content, the target specifications data field remains empty. However, for those programs with supplemental content, the target specification to the target resource containing the supplemental content is entered in the data field 58 (step 152) and correlated with the program (step 154). The correlation is provided through the data structure by the placing the target specification within the same data record as the program title and other information for a particular program.

At step 156, the processor searches the local EPG data records to find interactive programs. A program is considered interactive if an associated target specification is present in the data field 58 (step 158). If no target specification is listed (i.e., the “no” branch from step 158), the search proceeds to the next program record. If a target specification exists (i.e., the “yes” branch from step 158), the program record is added to the list of interactive programs (step 160). This process continues until the last data record is examined, as indicated by step 162. When the EPG has compiled a list of interactive programs, the list can be presented to the viewer in the EPG UI (step 164).

The viewer computer permits a viewer to enter other target specifications in addition to those provided by the content provider. For instance, suppose the viewer enjoys watching sports on an all sports network, such as ESPN. In addition to the target specifications to any ESPN-sponsored target resource, the viewer might wish to add a target specification to a target resource sponsored by his/her

1 favorite magazine, such as Sports Illustrated. The processor presents a dialog
2 window which enables the viewer to enter additional target specifications (such as
3 URLs) and associate them with a particular program or channel.

4 If a program or channel has more than one target specification associated
5 with it, the viewer computer can be configured to prioritize the target
6 specifications according to the viewer's preferences. For example, suppose that
7 the channel NBC has target resources containing content for dramas, movies,
8 sitcoms, soap operas, sports, news, and so on. The viewer is interested primarily in
9 sports. The viewer computer prioritizes the target specifications to the resources
10 so that the sports target specification is the default for activation of the NBC
11 channel label. In this manner, activation of the NBC channel label leads directly to
12 the target resources for NBC sports. The prioritizing process can be accomplished
13 using viewer intervention (e.g., using a dialog window to enable a viewer to
14 prioritize a list of target specifications), or automatically by monitoring the
15 viewer's usage pattern of the target specifications (e.g., counting hits on each
16 target specification and prioritizing based upon this hit count).

17 Another aspect of this invention concerns an efficient method for creating
18 shortcuts to a particular show or channel using a drag-and-drop operation. This
19 method is described with reference to Fig. 7, which shows the same EPG UI 110
20 on display 112 as is illustrated in Fig. 5, and to the flow diagram of Fig. 8.

21 For purposes of explaining the process, consider the following example in
22 which a viewer decides to create a shortcut to a program on the NBC channel.
23 Suppose a viewer wants to watch "Seinfeld," which begins at 9:00 PM. Until then,
24 however, the viewer wants to use the user interface unit for other applications, like
25 performing banking transaction, or purchasing a product, or writing a document.

1 To create a short cut, the viewer activates the EPG UI 110 for display on the screen
2 (step 200 in Fig. 8). Using a handset, mouse, or other tool, the viewer clicks on the
3 program tile with the Seinfeld (title and/or logo) 180 and drags the label from the
4 EPG UI 110 to another location on the screen (step 202 in Fig. 8). The viewer
5 drops the Seinfeld label at an outer area of the screen (step 204 in Fig. 8). The
6 drag-and-drop operation results in creation of an instruction that becomes
7 associated with the Seinfeld label 180 (step 206 in Fig. 8).

8 The viewer can then close the EPG UI window 110 and proceed to other
9 applications. The Seinfeld label 180 remains visible for ready access back to the
10 NBC channel. When the viewer activates the Seinfeld label 180 (i.e., the “yes”
11 branch from step 208), the instruction associated with the label directs the user
12 interface unit to perform one of three actions; depending in part upon whether the
13 Seinfeld program is playing (step 210 in Fig. 8). If it is, the user interface unit
14 tunes to the NBC channel and begins showing the video content stream for
15 “Seinfeld” (step 212 in Fig. 8).

16 On the other hand, suppose that the time is only 8:00 PM, and the Seinfeld
17 program is not scheduled to start for another hour. In this case (i.e., the “no”
18 branch from step 210), the user interface unit can perform one or two operations.
19 First, the user interface unit can invoke some code to reference a target resource
20 having information on the Seinfeld program (step 214 in Fig. 8). For instance, the
21 instruction might call for invoking the Web browser 106 to render an NBC Web
22 page for information on “Seinfeld.” A second operation might be to initiate a
23 routine which will record the program “Seinfeld” when the program begins playing
24 at 9:00 PM (step 216 in Fig. 8).

1 The instruction created during the drag-and-drop procedure might also be
2 configured to automatically tune to the program at the start time of the program,
3 without any viewer initiation. For instance, the reminder created by dragging the
4 Seinfeld label from the EPG UI causes the display unit to tune automatically to the
5 appropriate channel (e.g., NBC) at the start time of 9:00 PM for the Seinfeld
6 program. The EPG maintains a time of day clock to know when the programs
7 start. Alternatively, the instruction might entail automatic tuning to the appropriate
8 channel to record the program beginning at its start time.

9 The drag and drop aspects described above are preferably implemented
10 using object linking and embedding (OLE), which is commercially available from
11 Microsoft Corporation. OLE is an extensible service architecture built on the
12 Component Object Model (COM) which is both language independent and
13 location independent. OLE supports an OLE Drag and Drop which is widely used
14 in Windows®-compatible operating systems, such as Windows® 95. OLE and
15 COM have been well documented and will not be explained in detail. For more
16 information regarding OLE and COM, refer to OLE 2 Programmer's Reference
17 and Inside OLE 2, Second Edition, both published by Microsoft Press of
18 Redmond, Washington, and both of which are hereby incorporated by reference.

19 It is noted that the viewer can also create shortcuts to the channels
20 themselves, rather than to a particular program. The viewer clicks on the channel
21 tile with a channel label (title, network name, and/or logo), drags the channel label
22 from the EPG UI 110, and drops it at another location on the screen. The drag-
23 and-drop operation results in creation of an instruction to tune the visual display
24 unit to the channel upon activation of the channel label. For more information on
25 short cuts, refer to pending U.S. Patent Application Serial No. 08/526,314 entitled

1 "Method and System for Providing Internet Shortcuts", which was filed on
2 September 11, 1995, and is assigned to Microsoft Corporation. This application is
3 hereby incorporated by reference.

4 In compliance with the statute, the invention has been described in language
5 more or less specific as to structure and method features. It is to be understood,
6 however, that the invention is not limited to the specific features described, since
7 the means herein disclosed comprise exemplary forms of putting the invention into
8 effect. The invention is, therefore, claimed in any of its forms or modifications
9 within the proper scope of the appended claims appropriately interpreted in
10 accordance with the doctrine of equivalents and other applicable judicial doctrines.
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